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(54) **Laundry detergent composition**

(57) A homogeneous laundry detergent composition comprising an organic detergent, a fabric softener

and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane.

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## Description

[0001] The present invention relates to a laundry detergent composition and, particularly but not exclusively, to a laundry detergent composition having detergency properties in combination with fabric-core benefits.

[0002] In recent years modern washing machines have been manufactured to work on an automatic basis whereby an operator inserts a load of laundry to be washed in the machine and then adds the detergent followed by the selection of a preprogrammed automated wash cycle, said wash cycle selection depending on the material as well as the colour of the laundry. Typically, such washing machines are provided with a main compartment in the form of a drum which holds the laundry together with a separate detergent compartment. Once the operator initiates the automated wash cycle the washing machine pumps water into the detergent compartment which causes the detergent and water to mix and flow into the drum which will eventually rotate under the power of an electric motor in accordance with the particular automated wash cycle selected, thus, forcing the water through the laundry. Thereafter the drum will automatically drain of liquid in a spin cycle. The drum is then filled with clean water and a rinse cycle begins in order to remove any remaining detergent from the laundry, again followed by a spin cycle. Once all of the water has been removed and the laundry has been spun, the laundry may be removed from the drum of the washing machine.

[0003] Commonly, however, it is desirable to use a fabric softener in combination with a detergent. The fabric softener is typically based on a cationic surfactant, such as an amino compound (i.e. a quaternary ammonium salt), and is applied to the laundry by adding said fabric softener to a separate sub-compartment within the detergent compartment. After the first spin cycle, as mentioned above, water is pumped into the sub-compartment causing the fabric softener and water mixture to flow into the drum for the rinse cycle.

[0004] As a consequence of certain consumer driven initiatives, particularly the desire of the consumer for a reduction in cost of laundry detergents as well as an increase in convenience, the two-in-one laundry detergent comprising a detergent and fabric softener was created.

[0005] The two-in-one laundry detergent requires careful blending of the various components thereof, particularly when a liquid detergent is to be produced, in order to preserve the homogeneity of the detergent and, thus, ensuring that each quantity of detergent provides a uniform dosage of detergent and fabric softener.

[0006] The two-in-one laundry detergent suffers from several drawbacks, however, one being that fabric softeners used in such detergents do not always provide satisfactory fabric softening properties. Secondly, the two-in-one laundry detergent is susceptible to long term stability problems due to the low miscibility of a detergent and fabric softener.

[0007] The present invention has been made from a consideration of the above-mentioned problems.

[0008] According to a first aspect of the present invention therefore there is provided a homogeneous laundry detergent composition comprising an organic detergent, a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane.

[0009] This composition is advantageous as said composition provides a three-in-one laundry detergent which has a satisfactory cleaning performance, exhibits excellent through-the-wash softening properties whilst additionally providing fabric conditioning benefits to the fabric being washed, such benefits including ease-of-ironing properties.

[0010] Furthermore, although the components of the laundry detergent composition are known individually it is surprising that they are capable of being combined such that they can work synergistically as a three-in-one laundry detergent composition along side each other.

[0011] In a preferred embodiment of the invention the fabric conditioning agent selected from an organic silicone or organic siloxane comprises at least one copolymer of polyalkyl siloxane and an organic quaternary ammonium salt or at least one copolymer or polyalkyl silicone and an organic quaternary ammonium salt. Preferred fabric conditioning agents include a dimethicone copolyol and/or a copolymer of polyalkyl siloxanes and organic quaternary groups, such as silicone Quaternium 8. Ideally, the fabric conditioning agent comprises dimethicone copolyol amido di-linoleyl ammonium chloride or a derivative thereof.

[0012] The detergent component of the present invention may be selected from any suitable anionic, amphoteric, non-ionic, zwitterionic surfactant or mixtures thereof. Preferred anionic surfactants include alcohol ether sulphates and/or sodium lauryl ethoxy (3EO) sulphate, e.g. Empimim KSN 27 (trade mark of Albright & Wilson). Preferred nonionic surfactants include alcohol ethoxylates, C<sub>13</sub>-C<sub>15</sub> alcohol + 3 moles ethylene oxide, e.g. Synperonic A3 (trade name of I.C.I.), C<sub>13</sub>-C<sub>15</sub> alcohol + 7 moles ethylene oxide, e.g. Synperonic A7 (trade name of I.C.I.). Preferred amphoteric surfactants include coco amido propyl dimethyl betaine (CAB), e.g. Genagen 818X (trade name of Hoechst), oleoamphocarboxyglycinates, e.g. Ampholak X07 (trade name of Akzo Nobel).

[0013] The fabric softener component of the present invention may be selected from any suitable cationic surfactant (s). Preferably the cationic surfactant comprises either alone or in combination surfactants selected from any suitable quaternary ammonium compound; quaternary pyridine based compound; quaternary dialkylester (such as Rewoquat WE 18); organic compounds having a C<sub>12</sub> to C<sub>18</sub> hydrocarbon chain of an amine, an ester, an acid or an amine oxide; or a derivative thereof.

[0014] The laundry detergent composition of the present invention may be provided in a solid particulate form or as

a liquid dispersion. The detergent composition is preferably provided in the form of a liquid dispersion.

**[0015]** Where the detergent composition of the present invention is provided as a liquid dispersion a carrier fluid is provided which may be a polar solvent, preferably water.

**[0016]** Further components which may be utilised in the present invention include detergent builders, sequestrants, chelants, optical brighteners, opacifiers, pH modifiers, enzymes, enzyme stabilisers, antifoams, antiredeposition agents, bleaches, bleach activators, soil release polymers, perfumes, dye transfer protection means, antioxidants, colourants and zeolite dispersants.

**[0017]** Preferred sequestrants are phosphonates and/or amino-tri(methylene phosphonic acid), e.g. Dequest 2000 (trade mark of Solutia), preferred optical brighteners include stilbene derivatives, e.g. Leucophor MTD (Clariant Ltd). Preferred opacifiers include aqueous styrene/acrylic polymer dispersions e.g. Opacifiers 621 (trade name of Morton International Ltd).

**[0018]** The laundry detergent composition of the present invention may comprise any of the following components, preferably in the following range of % weight of the final composition as set out below, namely:

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Component	%wt. Range
Carrier fluid(s)	20-80
Organic detergents(s)	3-50
Fabric softener(s)	1-30

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Component	%wt. Range
Fabric conditioning agent(s)	0.001-8
Further component(s)	0.01-45

**[0019]** Ideally the preferred % weight of the final composition of the various components of the laundry detergent composition are, namely:

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Component	%wt. ( $\pm 5\%$ )
Carrier fluid(s)	71.9
Organic detergent(s)	16.8
Fabric softener(s)	1.3
Fabric conditioning agent(s)	0.003
Further component(s)	10.0

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**[0020]** In the event that it is desired to produce a laundry detergent composition having a biological component, an enzyme, such as SAVINASE 16 LEX, can be incorporated as part of the further component(s) ideally in an amount of 0.1-1.0%wt of the final composition.

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**[0021]** According to a second aspect of the present invention therefore there is provided a method of preparing a homogeneous detergent composition comprising the blending of at least two separate formulations wherein a first formulation comprises an organic detergent and a second formulation comprises a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane and wherein the first formulation represents the major component of the homogeneous detergent composition.

**[0022]** This method is advantageous as it facilitates the production of a laundry detergent composition comprising a detergent, a fabric softener and a fabric conditioning agent which has, surprisingly, excellent stability which allows a uniform dosage of the various components of the detergent to be present in each portion thereof.

**[0023]** In a preferred embodiment of the present invention there are two separate formulations.

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**[0024]** Ideally the first formulation comprises a carrier fluid. The first formulation may additionally comprise any of the further components which may be utilised in the present invention. The first formulation may comprise any and ideally all of the following components, preferably in the range of % weight of the final detergent composition as set out below, namely:-

55

Component	%wt. Range
Carrier fluid(s)	10-50
Organic detergent(s)	3-50

(continued)

Component	%wt. Range
Further component(s)	0.01-45

**[0025]** The carrier fluid in the first formulation is preferably water. The detergent of the first formulation ideally comprises from 2-25%wt. alcohol ether sulphate; from 0.5-10%wt. cocoamidoalkyl betaine; and from 0.1-20% alcohol ethoxylate.

**[0026]** The further components of the first formulation may comprise any of the following either alone or in combination: from 0.75-10%wt. sequestrant (preferably amino-tri(methylene phosphonic acid) and derivatives thereof; from 0.5-10%wt. C<sub>10</sub>-C<sub>12</sub> fatty acids; from 0.5-6% sodium hydroxide solution (preferably 32% solution); from 1-15% sodium tripolyphosphate; from 0.5-10%wt. borates; from 1-15%wt. inorganic phosphates; from 0.05-10%wt. optical brighteners (preferably a stilbene derivative or the like); from 1-15% alkyl amphocarboxyglycinates; from 0.01-1% opacifiers (preferably aqueous styrene/acrylic polymer dispersions and the like); if a biological laundry detergent composition is to be produced there may be from 0.1-1.0% of an enzyme. An aqueous Protease is preferred (such as SAVINASE 16 LEX).

**[0027]** In a preferred embodiment of the present invention the first formulation comprises any and preferably each of the following components ideally in the following preferred % weight:-

	Component	%wt. of Final Composition
1.	Water	39.733
2.	Sequestrant	3.333
3.	Sodium hydroxide (32% sol)	3.333
4.	Sodium tripolyphosphate	3.333
5.	Alcohol ether sulphate	9.000
6.	Coco amido alkyl betaine	1.333
7.	Perfume	0.200
8.	Alcohol ethoxylates	2.000
9.	Optical brightener	0.2000
10.	Amphoteric surfactant	4.000
11.	Opacifier	0.067
12.	Others	0.135
	<b>Total</b>	<b>66.667%</b>

**[0028]** Ideally, the second formulation comprises a carrier fluid. The second formulation may comprise any and preferably each of the following components ideally in the following preferred range of % weight of the final detergent composition, namely:-

Component	%wt. Range
Carrier fluid(s)	10-30
Fabric softener(s)	1-30
Fabric conditioning agent(s)	0.001-8

**[0029]** The carrier fluid of the second formulation is preferably water. The fabric softener of the second formulation ideally comprises any of the following either alone or in combination from 0.075-10%wt. quaternary dialkylesters; from 0.075-10%wt. quaternary imidazoline derivatives; from 0.75-10% dialkyl imidazoline methosulphates; and or from 0.75-10% quaternary fatty diamides. The fabric conditioning agent of the present invention preferably comprises from 0.001-4%wt. organic silicone; and or from 0.001-4% organic siloxane. The fabric conditioning agent of the present invention even more preferably comprises from 0.001-4% dimethicone copolyol; and/or comprises from 0.001-4% copolymer of polyalkyl siloxane and organic quaternary ammonium salt.

**[0030]** The second formulation preferably comprises any and preferably each of the following components ideally in the following preferred % weights, namely:-

	Component	%wt. of Final Composition
1.	Water	32.069
2.	Quaternary dialkylester	1.261
3.	Copolymer of polyalkyl dimethicone copolyol amido alkyl ammonium chloride	0.003
	<b>Total</b>	<b>33.333%</b>

[0031] Ideally the components of the first and second formulation are added, in sequential number order as set out above with each addition followed by agitation prior to the addition of the following component. Once all of the components of each of the formulations have been added, each formulation is agitated sufficiently to ensure no agglomerates are present. Thereafter the first formulation is gradually combined with the second formulation, whilst under conditions of agitation in order to ensure that no agglomerates are present in the final laundry detergent composition.

[0032] In order that the present invention can be more readily understood a specific embodiment thereof will now be described by way of example.

#### Example of Liquid Laundry Detergent Composition

[0033] The detergent composition is made, in a first instance, as two separate formulations. Each component of the two formulations is added in sequential number order.

#### First Formulation

[0034]

Component	Mass Kg	%wt. of Final Composition
1. Water	1192.0	39.733
2. DEQUEST 2000	100.0	3.333
3. Sodium hydroxide (32% Sol.)	100.0	3.333
4. Sodium tripolyphosphate	100.0	3.333
5. Empimin KSN 27	270.0	9.000
6. CAB	40.0	1.333
7. Perfume	6.0	0.200
8. SYNPERONIC A7	45.0	1.500
9. SYNPERONIC A3	15.0	0.500
10. LEUCHOPOR MTD	6.0	0.200
11. AMPHOLAC X07	120.0	4.000
12. OPACIFIER 621	2.0	0.067
13. Formalin	2.0	0.068
14. 2.5% WILLIAMS BLUE	2.0	0.067
<b>Total</b>	<b>2000Kg</b>	<b>66,667%</b>

#### Second Formulation

[0035]

Component	Mass Kg	%wt. of Final Composition
1. Water	962.07	32.069
2. REWOQUAT WE 18	37.82	1.261
3. SILICONE QUATERNIUM 8	0.11	0.003
<b>Total</b>	<b>1000.00Kg</b>	<b>33.333%</b>

[0036] Once both the first formulation and the second formulation have been agitated sufficiently (i.e. - no agglomerates are present), the two formulations are combined under conditions of agitation. The resulting detergent composition is homogeneous, has long term stability properties and has a final weight of 3000Kg.

[0037] It is to be noted that the stability of the homogeneous detergent composition is directly related to the ratio in which the respective formulations are mixed. Increased levels of formulation 2 result in "splitting" of the final product. "Splitting" is where the two separate formulations are no longer miscible and separation thereof cannot be prevented.

[0038] It is to be understood that the above described embodiment is by way of example only and that many modifications and variations are possible.

## Claims

1. A homogeneous laundry detergent composition comprising an organic detergent, a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane.
2. A homogeneous laundry detergent composition as claimed in claim 1, characterised in that the said fabric conditioning agent comprises at least one copolymer of polyalkyl siloxane and an organic quaternary ammonium salt or at least one copolymer or polyalkyl silicone and an organic quaternary ammonium salt.
3. A homogeneous laundry detergent composition as claimed in claim 1 or claim 2, characterised in that the said fabric conditioning agent comprises a dimethicone copolyol.
4. A homogeneous laundry detergent composition as claimed in any preceding claim, characterised in that the said fabric conditioning agent comprises dimethicone copolyol amido di-linoleyl ammonium chloride or a derivative thereof.
5. A homogeneous laundry detergent composition as claimed in any preceding claim, characterised in that the said fabric softener comprises a cationic surfactant.
6. A homogenous detergent composition as claimed in any preceding claim, characterised in that the fabric softener is selected from any suitable quaternary ammonium compound, quaternary pyridine based compound; quaternary dialkylester; organic compounds having a C<sub>12</sub> to C<sub>18</sub> hydrocarbon chain of an amine, an ester, an acid or an amine oxide; or a derivative thereof.
7. A homogeneous detergent composition as claimed in any preceding claim, characterised in that the composition comprises said fabric conditioning agent in an amount from 0.001 % to 8% by weight of the total composition.
8. A homogeneous detergent composition as claimed in any preceding claim, characterised in that the composition comprises said fabric softener in an amount from 1 % to 30% by weight of the total composition.
9. A homogeneous detergent composition as claimed in any preceding claim wherein the composition is in the form of a liquid dispersion.
10. A method of preparing a homogenous detergent composition comprising the blending of at least two separate formulations wherein a first formulation comprises an organic detergent and a second formulation comprises a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane and wherein the first formulation represents the major component of the homogeneous detergent composition.



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EP 01 30 0711

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Place of search THE HAGUE		Date of completion of the search 9 May 2001	Examiner Saunders, T
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